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PER CAPITA GREENHOUSE GAS (GHG) EMISSIONS BELOW G20 AVERAGE

India's per capita greenhouse gas emissions are far below the G20 average. However, India's emissions have been trending strongly upwards over the past decade and are projected to increase further.

GHG emissions (incl. land use)
per capita (tCO₂e/capita)¹



Data for 2017.
Sources: UN
Department of
Economic and Social
Affairs Population
Division, 2020; CAT
2019; Gütschow et
al., 2019

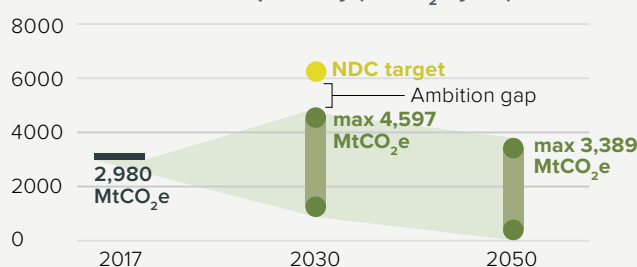
NOT ON TRACK FOR A 1.5°C WORLD



India needs to restrict the increase in emissions to below 4,597 MtCO₂e by 2030 and to below 3,389 MtCO₂e by 2050 to be within its fair-share range compatible with global 1.5°C IPCC scenarios. India's

2030 NDC, however, would only limit its emissions to between 6,034 MtCO₂e and 6,203 MtCO₂e. India could become a global leader if it abandoned plans to build new coal fired power and phases out coal use for power by 2040. All figures exclude land use emissions and are based on pre-COVID-19 projections.

India 1.5°C 'fair-share' pathway (MtCO₂e/year)^{1&2}



Source: Climate Action Tracker, 2020

KEY OPPORTUNITIES FOR ENHANCING CLIMATE AMBITION



India both taxes and subsidises coal through different fiscal policies. **Removing price distorting subsidies will be essential to facilitate a rapid transition to renewables.** Redirecting subsidies away from fossil fuels to renewable energy sources could lead to cost savings, as well as significant co-benefits such as improved quality of air.



India currently has no plan for phasing out coal. India needs to develop a roadmap for the **coal phase-out and in doing so ensuring a just transition for workers and communities.**



India's transport sector currently accounting for 14% of its energy related CO₂ emissions, is a fast growing sector, with vehicle ownership growing quickly, and presents **an opportunity for the government to take stronger action to increase share of EVs, and meet its target of 30% electric vehicles by 2030.**

Sources: Coal India, 2018; Gordon-Harper, 2018; IEA, 2017; IEEFA, 2015; Laan et al., 2019; Slater, 2020

RECENT DEVELOPMENTS



In 2020, Indian government announced expansion of solar investment into the agricultural sector through its PM-KUSUM Scheme, which aims to develop 25GW of solar capacity by 2022.



The transition in the power sector is accelerating: Coal demand is falling, and the pipeline of planned new coal power generation is shrinking. Recent successful auctions of "round-the-clock" renewable power have shown renewable energy plus storage coming in with tariffs lower than those of coal.



India's plan to liberalise new investment in coal mines sends the wrong signal that coal production will continue into the future. Coal production is increasing and on track to produce a record high 700Mt of coal in 2020/21.

References: Cuenca, 2020; Shearer, 2020; Singh, 2020; The Economic Times, 2020b; Dutta, 2020; Bullard, 2020

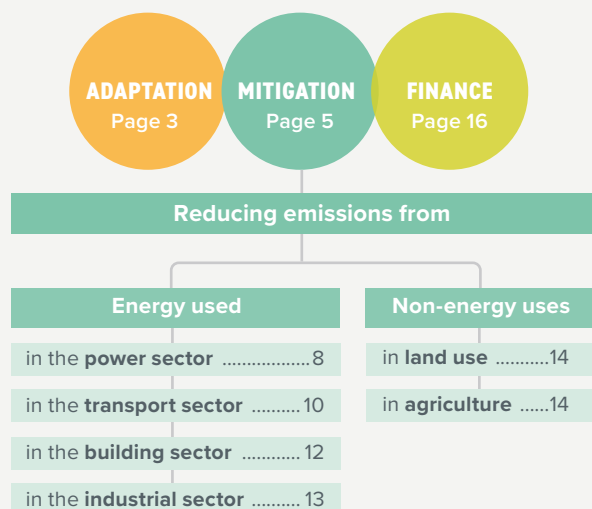
CORONAVIRUS RECOVERY

The COVID-19 pandemic brought India's economy to a standstill, exacerbating its economic and social challenges. In May 2020, Prime Minister Modi's USD 266bn COVID 19-relief package was nearly 10% of India's annual GDP, but had no substantial investments impacting the climate. Additional stimulus must focus on recovery and rebuilding, accelerating an energy transition in the power sector, transport, and urban planning. Without this, the likely drop in emissions from the lockdown will rise again without a green recovery.

References: Kugler and Sinha, 2020; Myllyvirta and Dahiya, 2020; Niti Aayog, 2020; Climate Action Tracker, 2020

CONTENTS

We unpack India's progress and highlight key opportunities to enhance climate action across:



LEGEND

Trends show developments over the past five years for which data are available. The thumbs indicate assessment from a climate protection perspective.



Decarbonisation Ratings⁴ assess a country's performance compared to other G20 countries. A high score reflects a relatively good effort from a climate protection perspective but is not necessarily 1.5°C compatible.



Policy Ratings⁵ evaluate a selection of policies that are essential pre-conditions for the longer-term transformation required to meet the 1.5°C limit.



SOCIO-ECONOMIC CONTEXT

Human Development Index

The Human Development Index reflects life expectancy, level of education, and per capita income. India ranks medium.



Data for 2018. Source: UNDP, 2019

Gross Domestic Product (GDP) per capita (PPP constant 2015 international \$)

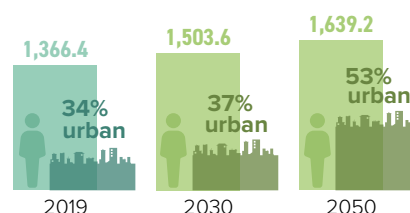


Data for 2019. Sources: The World Bank, 2020

Population and urbanisation projections

(in millions)

India's population is expected to increase by about 20% by 2050.



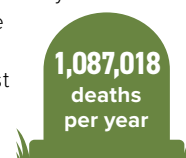
Source: The World Bank, 2019; United Nations, 2018

Death rate attributable to air pollution

Ambient air pollution attributable death rate per 1,000 population per year, age standardised



More than one million people die in India every year as a result of outdoor air pollution, due to stroke, heart disease, lung cancer and chronic respiratory diseases. Compared to the total population, this is the highest level in the G20.



Data for 2016. Source: WHO, 2018

JUST TRANSITION



CIRCULAR ECONOMY SOLUTIONS NEEDED

While investment in renewables has exceeded that in coal since 2016, **India has no roadmap to transition away from coal, allocating no specific funding towards a just transition in its COVID-19 relief package.**

As India's coal mining industry directly employs 485,000 people, a transition plan is important. To protect and create jobs, a shift to renewable energy – such as large-scale solar (>1GW) – is becoming urgent.

References: Climate Action Tracker, 2020; Pai et al., 2020; Prayas Energy Group, 2019

It is estimated that around 1,000GW of utility-scale solar would be required to transition all of India's coal workers into the renewable industry.

Boosting energy efficiency as well as domestic manufacturing in the area of renewable energy leveraging "Make in India" as well as circular economy solutions could become another feature of a just transition.

Given the sector linkages with other sectors, the **transition away from coal is likely to be complex** requiring dialogue with all stakeholders involved, including at sub-national level.

1. ADAPTATION

ADDRESSING AND REDUCING VULNERABILITY TO CLIMATE CHANGE



PARIS AGREEMENT Increase the ability to adapt to the adverse effects of climate change and foster climate resilience and low-GHG development.



VULNERABLE TO CLIMATE CHANGE

India is vulnerable to climate change and **adaptation actions are needed.**



COST OF EXTREME WEATHER

On average, 2,925 fatalities and almost USD 14bn losses occur yearly due to extreme weather events.



SUSCEPTIBLE TO VERY HIGH IMPACT

India is ranked as susceptible to “very high” impact in these areas even if temperature increase is held to 1.5°C.

ADAPTATION NEEDS

Climate Risk Index

Impacts of extreme weather events in terms of fatalities and economic losses that occurred. All numbers are averages (1999-2018).

Annual weather related fatalities



0.25
PER 100,000
INHABITANTS

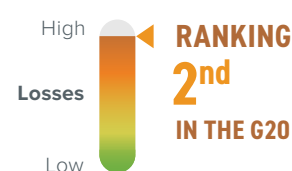


Source: Based on Germanwatch, 2019

Annual average losses (USD mn PPP)



26
PER UNIT
GDP (%)



Source: Based on Germanwatch, 2019

Exposure to future impacts at 1.5°C, 2°C and 3°C

Impact ranking scale:

! Very low ! Low ! Medium ! High ! Very high

			1.5°C	2°C	3°C
WATER	% of area with increase in water scarcity		!	!	!
	% of time in drought conditions		!	!	!
HEAT AND HEALTH	Heatwave frequency		!	!	!
	Days above 35°C		!	!	!
AGRICULTURE	Maize	Reduction in crop duration	!	!	!
		Hot spell frequency	!	!	!
		Reduction in rainfall	!	!	!
	Rice	Reduction in crop duration	!	!	!
		Hot spell frequency	!	!	!
		Reduction in rainfall	!	!	!
	Wheat	Reduction in crop duration	!	!	!
		Hot spell frequency	!	!	!
		Reduction in rainfall	!	!	!

Source: Water, Heat and Health: own research. Agriculture: Arnell et al., 2019

Note: These indicators are national scale results, weighted by area and based on global data sets. They are designed to allow comparison between regions and countries and therefore entail simplifications. They do not reflect local impacts within the country. Please see technical note for further information.

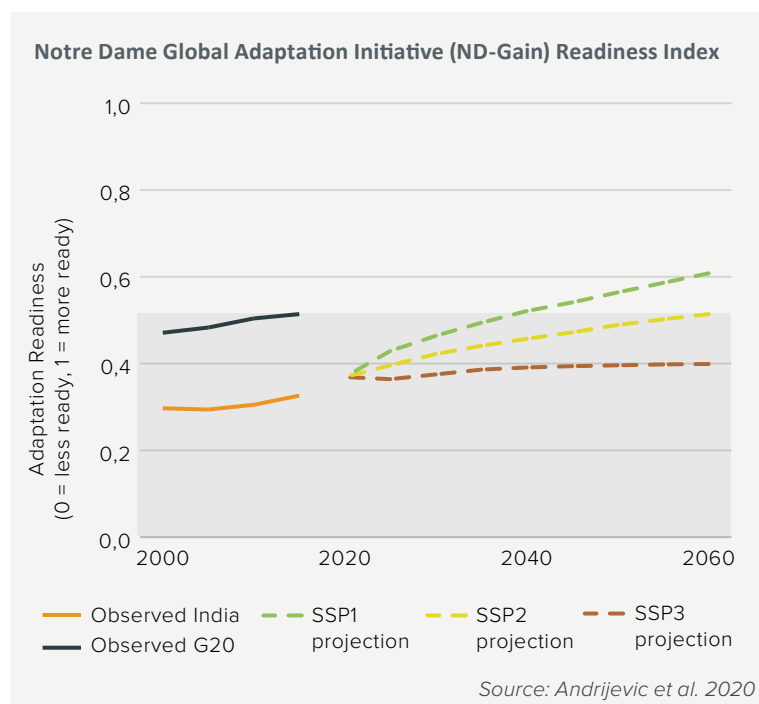
CORONAVIRUS RECOVERY

COVID-19 economic recovery spending has not focussed on increasing India's climate change resilience. No specific measures in the areas of increased building resilience e.g. in sectors such as agriculture, water, urban planning, coastal planning, and public health. Have been announced Rather, schemes such as the National Rural Employment Guarantee and subsidising food grains have been useful in negating further unemployment and ensuring social stability. The impact of the pandemic has been somewhat buffered by a strong rural agricultural production in 2020.

Reference: Kugler and Sinha, 2020

Adaptation readiness

The figure shows 2000-2015 observed data from the ND-GAIN Index overlaid with projected Shared Socioeconomic Pathways (SSPs) from 2015-2060.



India scored well below the G20 average in 2015 in terms of adaptation readiness. It has both a great need for investment and innovations to improve readiness and an urgent need for implementation of adaptation measures. Even if it puts in place social, economic and governance measures compatible with SSP1, it will only reach the G20's 2015 average score in 2040. Other socio-economic developments, as represented by SSP2 and SSP3, will perpetuate its ranking below the G20 average in 2015, until 2060.

The readiness component of the Index created by the Notre Dame Global Adaptation Initiative (NDGAIN) encompasses social economic and governance indicators to assess a country's readiness to deploy private and public investments in aid of adaptation. The index ranges from 0 (low readiness) to 1 (high readiness).

The overlaid SSPs are qualitative and quantitative representations of a range of possible futures. The three scenarios shown here in dotted lines are qualitatively described as a *sustainable development-compatible scenario* (SSP1), a *middle-of-the-road* (SSP2) and a *'Regional Rivalry'* (SSP3) scenario. The shaded area delineates the G20 average in 2015 for easy reference.

Source: Andrijevic et al. 2020

ADAPTATION POLICIES

National Adaptation Strategies

Document name	Publication year	Fields of action (sectors)												M&E process	
		Agriculture	Biodiversity	Coastal areas and fishing	Education and research	Energy and industry	Finance and insurance	Forestry	Health	Infrastructure	Tourism	Transport	Urbanism		Water
National Adaptation Plan for Climate Change	2020	●	●	●	●	●			●	●				●	n/a

Nationally Determined Contribution (NDC): Adaptation

Targets	Actions
Not mentioned	See sectors specified in the National Action Plan on Climate Change (2008)

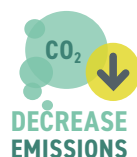
2. MITIGATION

REDUCING EMISSIONS TO LIMIT GLOBAL TEMPERATURE INCREASE



Hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit to 1.5°C, recognising that this would significantly reduce the risks and impacts of climate change.

EMISSIONS OVERVIEW



India's GHG emissions have increased by 176% between 1990 and 2017. The government's climate targets for 2030 (40% non-fossil-fuel share of power generation capacity, and 33-35% reduction in emissions intensity of GDP) are **not in line with a 1.5°C pathway**.

Sources: Climate Action Tracker, 2020; Enerdata, 2020

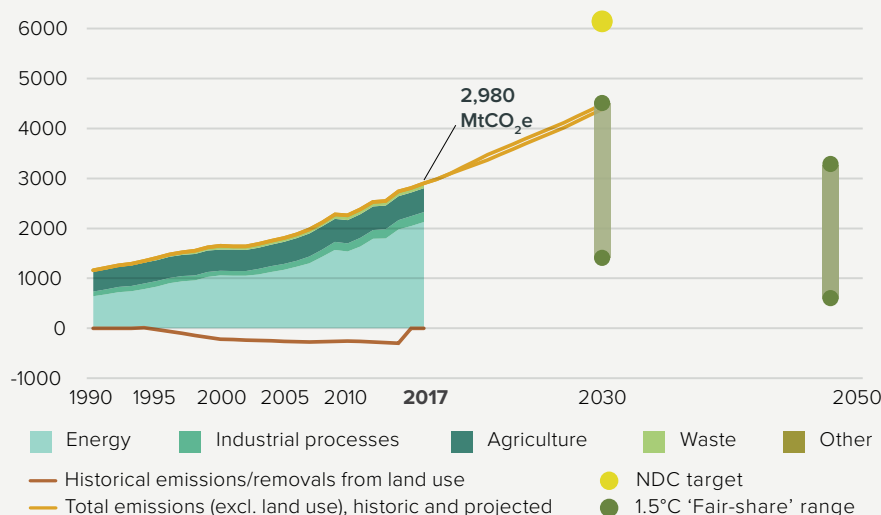


In 2030, global CO₂ emissions need to be 45% below 2010 levels and reach net-zero by 2050. **Global energy-related CO₂ emissions must be cut by 40%** below 2010 levels by 2030 and reach net-zero by 2060.

Source: Rogelj et al., 2018

GHG emissions across sectors and CAT 1.5°C 'fair-share' range (MtCO₂e/year)

Total GHG emissions across sectors (MtCO₂e/year)

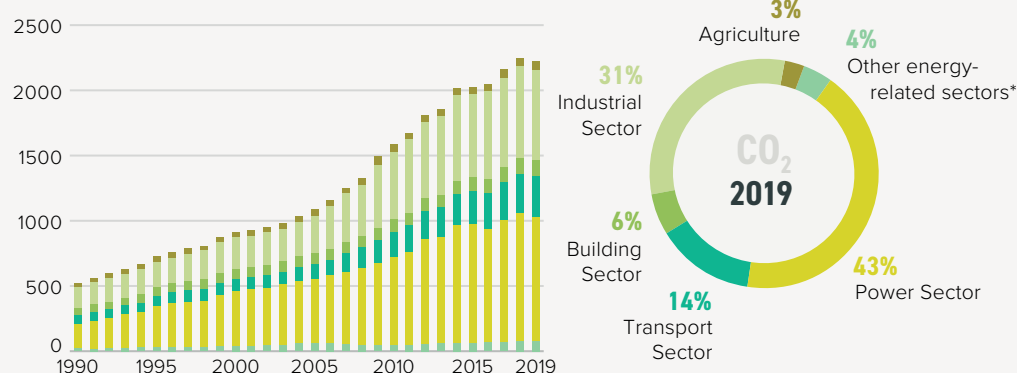


India's emissions (excl. land use) have nearly tripled from 1990 to 2017, largely due to a sustained increase in energy related emissions. The most recent emissions projections show that under current policies, emissions will continue to increase up to 2030 at a pace to remain within its national mitigation targets, which are themselves not yet compatible with the Paris Agreement. Greater emissions reduction will be required to become 1.5°C 'fair-share' compatible.

Sources: Gütschow et al., 2019; Climate Action Tracker 2020

Energy-related CO₂ emissions by sector

Annual CO₂ emissions from fuel combustion (MtCO₂/year)



The largest driver of overall GHG emissions are CO₂ emissions from fuel combustion, and these have been increasing since 1990, but fell slightly for the first time since 1990 in 2019.

The electricity sector with 43% of total emissions is the largest contributor, followed by industry with 31%, with both having fallen in 2019 compared to previous year.

Sources: Climate Action Tracker, 2020; Enerdata, 2020

CORONAVIRUS RECOVERY

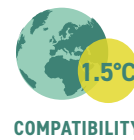
The COVID-19 pandemic has revealed structural fragilities of India's development model that the recovery package can address. Firstly, the recovery package can invest in energy-efficient affordable housing for clean and inclusive urbanisation. Secondly, the recovery package could consist of a massive rollout of electrified buses to large and mid-sized cities, and further subsidies for EVs to increase attractiveness and inclusiveness of urbanisation. Finally, investing in manufacturing capacity for clean technologies is essential.

ENERGY OVERVIEW



India's energy mix is still dominated by fossil fuels (74%) and despite the increase in renewable energy over the last two decades, the carbon intensity of the energy mix has remained almost constant at around 58 tCO₂ over the last five years. Energy related CO₂ emissions fell in 2019 for the first time in four decades, with slowing demand growth and increasing share of renewable energy reducing coal use.

Source: Enerdata, 2020

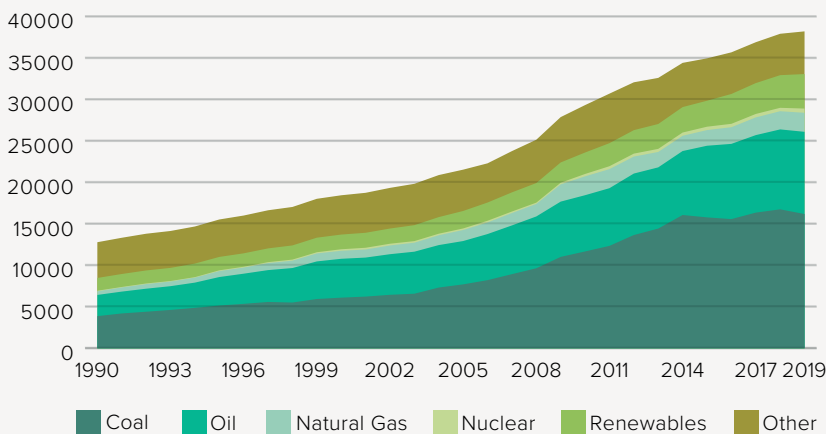


The share of **fossil fuels in the global primary energy mix needs to fall to 67% by 2030 and to 33% by 2050** (and to substantially lower levels without Carbon Capture and Storage).

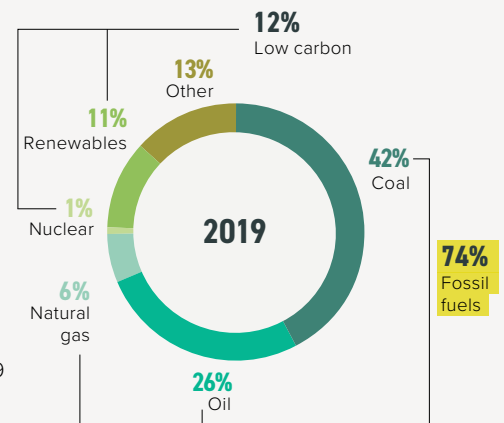
Source: Rogelj et al., 2018

Energy Mix

Total primary energy supply (PJ)



Source: Enerdata, 2020

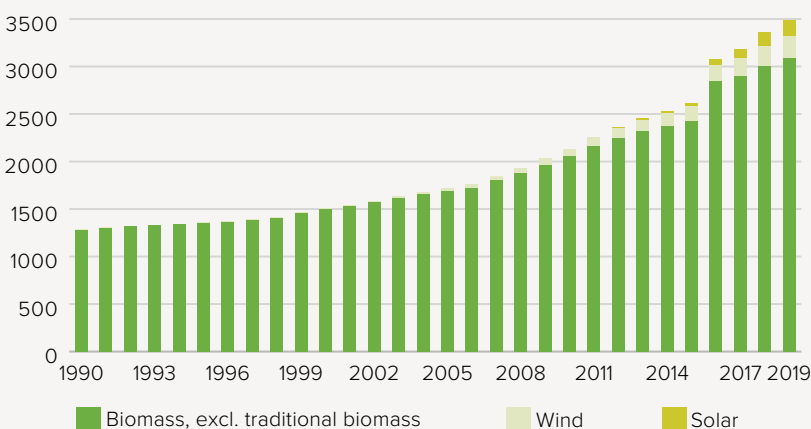


Due to rounding, some graphs may sum to slightly above or below 100%.

This graph shows the fuel mix for all energy supply, including energy used not only for electricity generation, heating, cooking, but also for transport fuels. Fossil fuels (oil, coal and gas) still make up 74% of India's energy mix, which is lower than the G20 average. "Other" includes traditional biomass, a significant source of energy heating and cooking, particularly for poorer households.

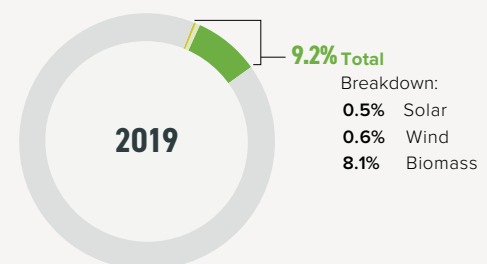
Solar, Wind, Geothermal, and Biomass Development

Total primary energy supply (TPES) from solar, wind, geothermal and biomass (PJ)



Large hydropower and solid fuel biomass in residential use are not reflected due to their negative environmental and social impacts.
Due to rounding, some graphs may sum to slightly above or below 100%.

Solar, wind, geothermal and biomass account for 9% of India's energy supply



Decarbonisation rating: RE share of TPES compared to other G20 countries

5-year trend (2014-2019): **Medium**

Current year (2019): **High**

The share of renewable energy is higher than in G20 countries.

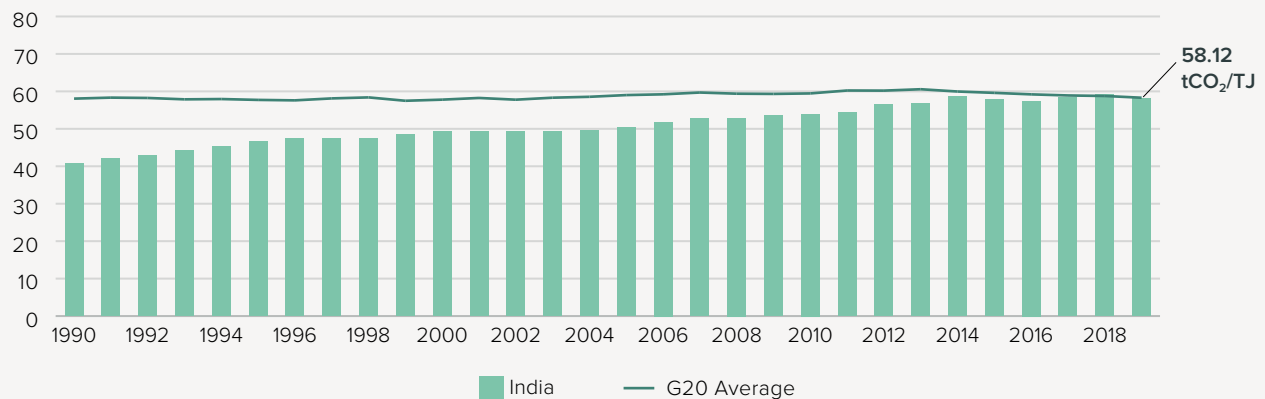
Source: own evaluation

Solar, wind and modern biomass account for around 9.2% of India's energy supply – the G20 average is 6.4%. From 2014-2019, the share of these sources (which do not include hydro) in total energy supply has increased by around 25%, less than the G20 average of 28%. Bioenergy (for electricity, and biofuels for transportation and heat) makes up the largest share of these sources (89% of total renewable energy supply), while wind and solar PV constitute 6% and 5% respectively.

Source: Enerdata, 2020

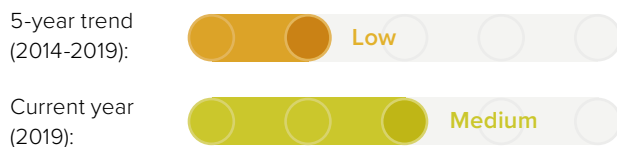
Carbon Intensity of the Energy Sector

Tonnes of CO₂ per unit of total primary energy supply (tCO₂/TJ)



Source: Enerdata, 2020

Decarbonisation rating: carbon intensity of the energy sector compared to other G20 countries

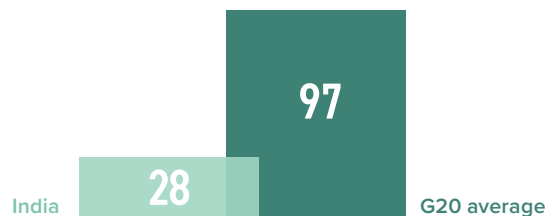


Carbon intensity shows how much CO₂ is emitted per unit of energy supply. In India, carbon intensity has remained almost constant at around 58 tCO₂ over the last five years and equals the G20 average. This reflects the continuously high share of fossil fuels in particular coal in the energy mix.

Source: own evaluation

Energy supply per capita

(GJ/capita)



Sources: Enerdata, 2020; The World Bank, 2019b

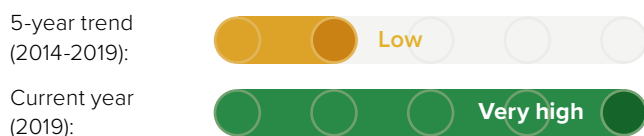
TPES per capita (GJ/capita): 5-year trend (2015-2019)



The level of energy use per capita is closely related to economic development, climatic conditions and the price of energy.

Energy use per capita in India is 28 GJ, well below the G20 average of 97 GJ, but is increasing at a faster rate (6.3% from 2014-2019) than the G20's average (1.9%).

Decarbonisation rating: energy supply per capita compared to other G20 countries



Source: own evaluation

Energy intensity of the economy

(TJ/PPP USD2015 millions)



Data for 2018. Sources: Enerdata, 2020; The World Bank, 2018

Energy intensity of the economy: 5-year trend (2013-2018)



This indicator quantifies how much energy is used for each unit of GDP, which is closely related to the level of industrialisation, efficiency, climatic conditions and geography.

At 4.02 TJ/PPP USD2015 million, India's economy has an energy intensity slightly below the G20 average of 4.46. **India's 5-year average of -22% (2013-2018) is trending downwards** at a much faster rate than the G20 average of -11.5%.

Decarbonisation rating: energy intensity compared to other G20 countries



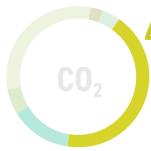
Source: own evaluation



POWER SECTOR

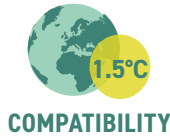
Emissions from energy used to make electricity and heat

India still produces 71% of its electricity from coal. Accounting for capacity additions and retirements, India's coal power capacity will increase significantly to 238 GW in 2027, a net increase of 46 GW from the installed capacity in 2017. This planned increase is not consistent with the Paris Agreement.



43% Electricity and heat account for 43% of energy related CO₂ emissions in India in 2019.

Source: Enerdata, 2020



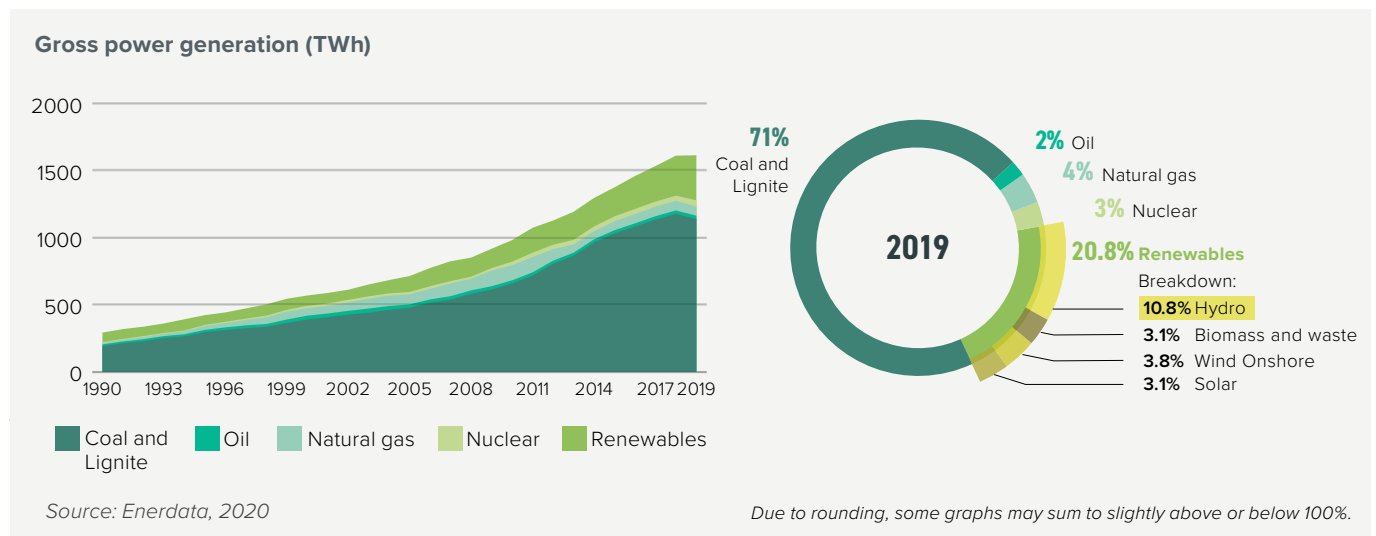
Coal and decarbonisation

Worldwide, **coal use for power generation needs to peak by 2020**, and between 2030 and 2040, all the regions of the world need to phase out coal-fired power generation. **Electricity generation has to be decarbonised before 2050**, with renewable energy the most promising alternative.

Sources: Rogelj et al., 2018; Climate Analytics, 2016; Climate Analytics, 2019

STATUS OF DECARBONISATION

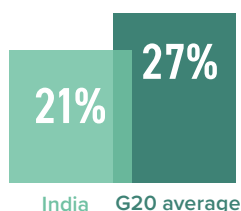
Electricity mix



India's electricity mix is dominated by coal (71% in 2019), which increased considerably and steadily over the last decade, only falling for the first time in 2019. India is increasingly producing power from renewables (21%), which have increased considerably over the past decade. Hydro power represents just over half of India's total renewable power generation, with wind, solar and biomass producing roughly equal amounts.

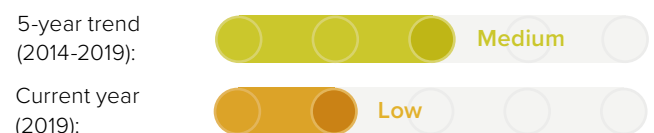
Share of renewables in power generation

(incl. large hydro)



Source: Enerdata, 2020

Decarbonisation rating: share of renewables compared to other G20 countries



Source: own evaluation

Share of renewables in power generation: 5-year trend (2014-2019)



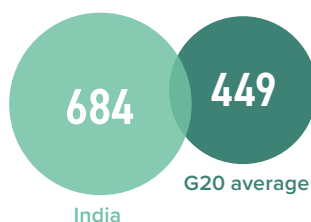
+27%
India



+19.5%
G20 average

Emissions intensity of the power sector

Country vs G20 average (gCO₂/kWh)



Source: Enerdata 2020

Emissions intensity: 5-year trend (2014-2019)



-16.3%
India



-10.3%
G20 average

For each kilowatt hour of electricity, 684gCO₂ are emitted in India. This is well above the G20 average of 449 reflecting the high share of coal. Emission intensity in India has dropped by 16.3% over the last five years, which is a faster rate of reduction compared with the G20 rate of 10.3%.

Decarbonisation rating: emissions intensity compared to other G20 countries

5-year trend
(2014-2019):



Current year
(2019):



Source: own evaluation

POLICY ASSESSMENT

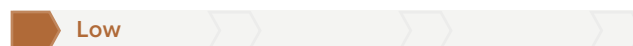
Renewable energy in the power sector



India aims for 40% non-fossil-based power capacity by 2030 but has no longer-term plan for renewables. In September 2019, the government announced a renewables target of 450 GW (as of December 2019 this stood at 86 GW) by 2030. This would lead to non-fossil capacity above 60% and place India ahead of its NDC target, which is consistent with the expected share based on current policies. **The clean energy programme doubled renewable capacity between 2014 and 2018.** The first round of bid submissions for “round-the-clock” (RTC) power tenders closed in May 2020. These RTC tenders can bundle RE from various sources, with power from coal-based thermal power projects to provide a minimum annual availability of 80%. **A minimum of 51 per cent of the energy must be dispatched from renewable sources** to qualify for this tariff-based competitive bidding tender.

Sources: Climate Action Tracker, 2020; The Economic Times, 2020a

Coal phase-out in the power sector



While India has had several energy efficiency and renewable energy expansion policies in effect, **it has no plan for phasing out coal.** The 2018 National Electricity Plan envisages net additions of 46 GW between 2022 and 2027. In the long term, the share of coal in power generation is likely to decrease due to the economic competitiveness of renewables and difficulties in financing and insuring new coal power plants. As early as 2019 the pre-construction pipeline fell by half from 2018 to 2019.

Sources: Climate Transparency, 2019; Shearer et al., 2020



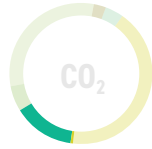
TRANSPORT SECTOR

Emissions from energy used to transport people and goods

Emissions from transport represent 14% of India's energy related CO₂ emissions and are growing very fast. Both passenger and freight **transport sectors are dominated by fossil fuels, with oil making up 96% of energy consumption** in the transport sector. Electric vehicles made up only 0.1% of new car sales in 2018. To stay within a 1.5°C limit, passenger and freight transport need to be decarbonised.

Share in energy-related CO₂ emissions from transport sector

Source: Enerdata, 2020



0.53%
Electricity-related emissions

14%
Direct emissions



COMPATIBILITY

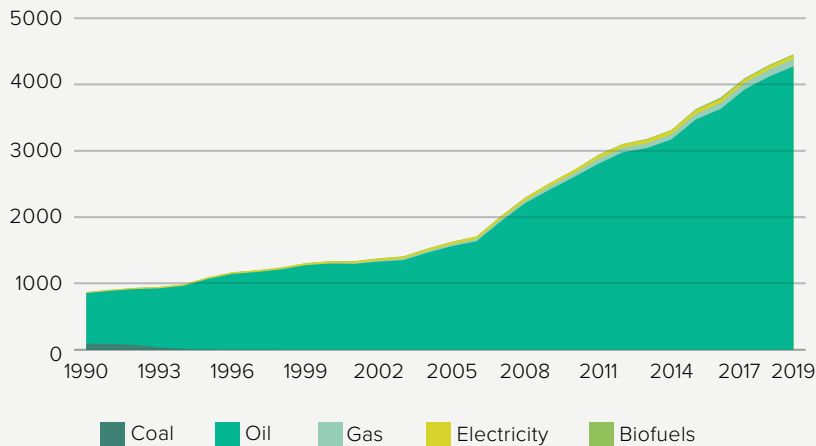
The share of low-carbon fuels in the transport fuel mix must increase to about 60% by 2050.

Source: Rogelj et al., 2018

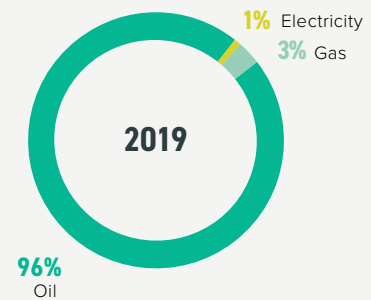
STATUS OF DECARBONISATION

Transport energy mix

Final energy consumption of transport by source (PJ/year)



Source: Enerdata, 2020



Due to rounding, some graphs may sum to slightly above or below 100%.

Electricity and biofuels make up only 1.6% of the energy mix in transport. Both have declined since 2016.

Transport emissions per capita

excl. aviation (tCO₂/capita)



Data for 2018. Sources: Enerdata, 2020; The World Bank, 2019

Transport emissions: 5-year trend (2013-2018)



+26.2%
India



+5.5%
G20 average

Decarbonisation rating: transport emissions compared to other G20 countries

5-year trend (2013-2018):



Current year (2018):



Source: own evaluation

Aviation emissions per capita⁶(tCO₂/capita)

Data for 2017. Source: Enerdata, 2020

Aviation emissions: 5-year trend (2012-2017)**+37.6%**
India**+18.7%**
G20 average**Decarbonisation rating: aviation emissions compared to other G20 countries**

5-year trend (2012-2017):



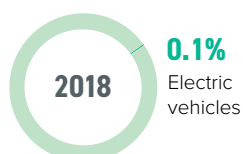
Current year (2017):



Source: own evaluation

Motorisation rate**17 VEHICLES PER 1,000 INHABITANTS (2014)**

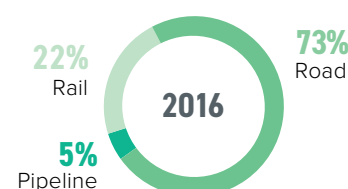
Source: Vieweg et al., 2018

Market share of electric vehicles in new car sales (%)

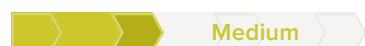
Source: IEA, 2019

Passenger transport
(modal split in % of passenger-km)

No data available

Freight transport
(modal split in % of tonne-km)

Data for 2016. Source: Vieweg et al., 2018

POLICY ASSESSMENT**Phase out fossil fuel cars**

India has announced a national target of 30% electric vehicles in new sales by 2030. In addition, the government is working on plans to require all two-wheelers to be electric by 2026. India's Faster Adoption and Manufacturing of Electric Vehicles (FAME II) remains the largest policy by funding, which approved a USD 1.4bn subsidy scheme to bolster the sales of electric vehicles. The government has also tightened emission standards to 113gCO₂/km, in effect from April 2022.

Source: own evaluation

Phase out fossil fuel heavy-duty vehicles

India has no strategy for reducing absolute emissions from freight transport. A fuel efficiency standard for HDVs weighing more than 12t has been in effect since 2018. As a result, it is estimated that fleet-wide fuel consumption of new vehicles will drop by 10.4% between 2018 and 2021.

Source: own evaluation

Modal shift in (ground) transport

Several national programmes, including the National Urban Transport policy and the Smart Cities Mission, have been established to reduce vehicle traffic and increase transport efficiency. There is, however, no overall longer-term strategy for promoting a modal shift.

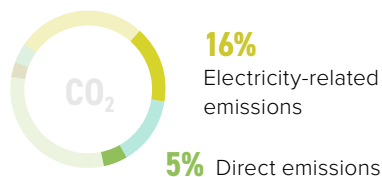
Source: own evaluation



BUILDING SECTOR

Emissions from energy used to build, heat and cool buildings

India's building emissions – counting heating, cooking and also electricity use – make up only a small portion (5%) of total CO₂ emissions. **Per capita, building-related emissions are only one quarter of the G20 average.**



Source: Enerdata, 2020



Global emissions from buildings need to be halved by 2030, and be 80-85% below 2010 levels by 2050, mostly through increased efficiency, reduced energy demand and electrification in conjunction with complete decarbonisation of the power sector.

Source: Rogelj et al., 2018

STATUS OF DECARBONISATION

Building emissions per capita

(incl. indirect emissions) (tCO₂/capita)



Source: Enerdata, 2020

Building-related emissions per capita are around one quarter of the G20 average. This reflects the relatively under-developed nature of India's housing stock. Over the period 2014-2019, however, per capita building-related emissions are increasing much faster than the G20 average, with electrification of almost all households being achieved in 2019 according to the Indian Government.

Building emissions: 5-year trend (2014-2019)



Decarbonisation rating: building emissions compared to other G20 countries

5-year trend (2014-2019):



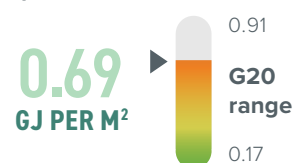
Current year (2019):



Source: own evaluation

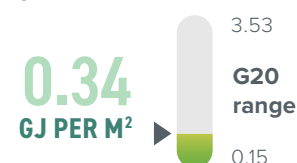
Residential buildings

Energy use per m²



Commercial and public buildings

Energy use per m²



Building emissions are largely driven by how much energy is used in heating, cooling, lighting, household appliances, etc. **In India, energy use per m² is in the upper range of the G20 countries for residential buildings, and at the lower range for commercial and government buildings.**

Source: Castro-Alvarez et al., 2018

POLICY ASSESSMENT

Near-zero energy new buildings

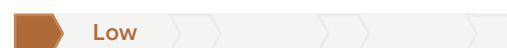


The government has not yet pursued a near-zero energy building strategy. In 2017, the government revised its Energy Conservation Building Code (ECBC) for new commercial buildings, aiming to reduce energy use by 50% by 2030. In 2018, the government launched the ECBC-R for residential buildings, followed by an Energy Efficiency Label in February 2019.

Implementation of ECBC codes by state governments and municipal administrations is delayed.

Source: own evaluation

Renovation of existing buildings



There are no policies related to energy retrofitting of existing buildings in India.

Source: own evaluation



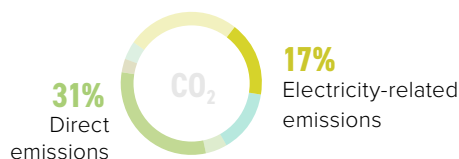
INDUSTRY SECTOR

Emissions from energy in the industrial sector

Industry-related emissions make up nearly a third of energy related CO₂ emissions in India and its industry emissions are reducing at the same rate (between 2012 and 2017) as the G20 average.

Share in energy-related CO₂ emissions from industrial sector

Source: Enerdata, 2020



Industrial emissions need to be reduced by 65-90% from 2010 levels by 2050.

Source: Rogelj et al., 2018

STATUS OF DECARBONISATION

Industry emissions intensity⁷

(tCO₂e/USD2015 GVA)



Data for 2016. Sources: Enerdata, 2020; Gütschow et al., 2019

Industry emissions: 5-year trend (2012-2017)



Decarbonisation rating: emissions intensity of industry compared to other G20 countries

5-year trend (2011-2016): Medium

Current year (2016): Very low

Source: own evaluation

Carbon intensity of cement production⁸

(kgCO₂/tonne product)

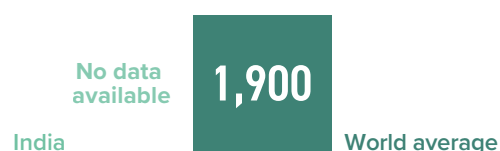


India's cement industry is slightly less emission intensive than the World average.

Data for 2016. Sources: CAT decarbonisation data portal, 2020; Climate Action Tracker, 2020

Carbon intensity of steel production⁸

(kgCO₂/tonne product)



Steel production and steelmaking are significant GHG emission sources, and challenging to decarbonise.

Data for 2016. World Average Source: World Steel Association, 2018.

POLICY ASSESSMENT

Energy Efficiency



According to the International Energy Agency (IEA), mandatory energy efficiency policies in India cover 26-50% of total energy use (as of 2017). The Perform, Achieve and Trade (PAT) scheme aims to reduce energy consumption. India has policies to encourage Energy Management Systems, mandatory energy audits and a mandate for energy managers, as well as agreements with manufacturers to improve energy efficiency.

Source: own evaluation



LAND USE SECTOR

Emissions from changes in the use of the land



NET SINK OF EMISSIONS

In order to stay within the 1.5°C limit, **India needs to make the land use and forest sector a net sink of emissions**, e.g. by halting the expansion of coal mining and protecting forests from infrastructure and industry developments, and by creating new forests.



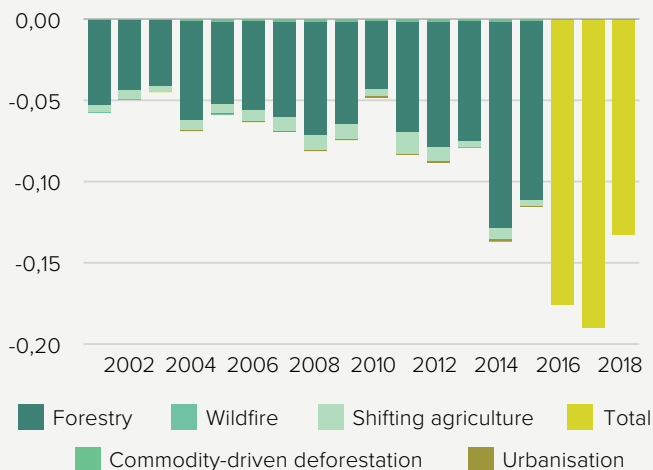
COMPATIBILITY

Global deforestation needs to be halted and changed to net CO₂ removals by around 2030.

Source: Rogelj et al., 2018

Global tree-cover loss

Gross tree-cover loss by dominant driver (million hectares)



This indicator covers only gross tree-cover loss and does not take tree-cover gain into account. It is thus not possible to deduce from this indicator the climate impact of the forest sector. 2000 tree cover extent – >30% tree canopy.

Source: Global Forest Watch, 2019

From 2001 to 2018, **India lost 1.62 Mha of tree cover, equivalent to a 5.2% decrease since 2000**. This does not take tree-cover gain into account.

POLICY ASSESSMENT

Target for net-zero deforestation



In November 2019, the Indian Ministry of Environment Forest and Climate Change released draft National Forest Policy to replace the existing, 30-year old policy. It calls for a minimum of one third of India to be under forest or tree cover, and supports the NDC target of creating an additional (cumulative) carbon sink of 2.5-3 GtCO₂e by 2030. The policy would guide forest management in India for the next 25 to 30 years.

The government's support of coal mining expansion has brought concerns about some regions with large tree cover loss and destruction of biodiversity.

The Green India Mission has fallen short of delivering enhanced carbon sequestration or meeting its goal of providing alternative fuel technologies to reduce emissions. It received only 30% of its allocated funding for use in the next five years.

Sources: Kukreti, 2019; Shree and Karmakar, 2019; Ellis-Petersen, 2020; Climate Action Tracker 2020



AGRICULTURE SECTOR

Emissions from agriculture



DIETARY SHIFTS ARE NEEDED

India's agricultural emissions are mainly from the **digestive processes of animals (enteric fermentation), livestock manure and use of synthetic fertilisers**. A 1.5°C 'fair-share' pathway requires dietary shifts, increased organic farming and less fertiliser use.



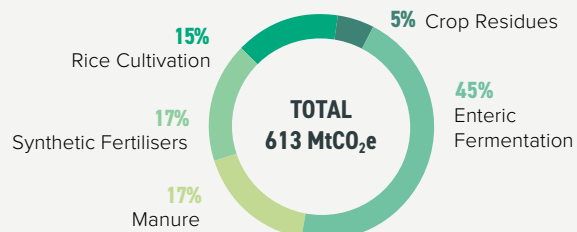
COMPATIBILITY

Methane emissions (mainly enteric fermentation) need to decline to 10% by 2030 and to 35% by 2050 (from 2010 levels). Nitrous oxide emissions (mainly from fertilisers and manure) need to be reduced by 10% by 2030 and by 20% by 2050 (from 2010 levels).
Source: Rogelj et al., 2018

Emissions from agriculture (excluding energy)

In India, the largest sources of GHG emissions in the agricultural sector are digestive processes of animals (enteric fermentation), livestock manure and the use of synthetic fertilisers. A shift to organic farming, more efficient use of fertilisers and dietary changes can help reduce emissions.

Data for 2017. Source: FAO, 2019



Due to rounding, some graphs may sum to slightly above or below 100%.

MITIGATION: TARGETS AND AMBITION

The combined mitigation effect of nationally determined contributions (NDC) submitted by September 2020 is not sufficient and will lead to a warming of 2.7°C by the end of the century. This highlights the urgent need for all countries to submit more ambitious targets by 2020, as they agreed in 2015, and to urgently strengthen their climate action to align to the Paris Agreement's temperature goal.

AMBITION: 2030 TARGETS

Nationally Determined Contribution (NDC): Mitigation

Targets

33-35% reduction in emissions intensity of GDP (compared to 2005 by 2030)

At least 40% non-fossil-fuel electric power capacity by 2030

Additional (cumulative) carbon sink of 2.5-3 GtCO₂e by 2030 through additional forest and tree cover

Actions

Actions specified in the following sectors: energy, industry, waste, transport, forestry

Climate Action Tracker (CAT) evaluation of NDC and actions

	Critically Insufficient
	Highly Insufficient
	Insufficient
●	2°C Compatible
	1.5°C Compatible
	Role Model

NDCs with this rating are consistent with the 2009 Copenhagen 2°C goal and therefore fall within a country's "fair share" range, but are not fully consistent with the Paris Agreement long term temperature goal. If all government NDCs were in this range, warming could be held below, but not well below 2°C, and still be too high to be consistent with the Paris Agreement 1.5°C limit.

To peak emissions and rapidly decrease levels afterward as required by the Paris Agreement, India needs to accelerate its transition from coal to renewable energy by supporting further uptake of electric vehicles, while ending the promotion of coal mining and increased coal production. India should also develop a just transition strategy to phase out coal for power generation before 2040.

Evaluation as at October 2020, based on country's NDC. Source: Climate Action Tracker

TRANSPARENCY: FACILITATING AMBITION

Countries are expected to communicate their NDCs in a clear and transparent manner in order to ensure accountability and comparability.

The NDC Transparency Check has been developed in response to Paris Agreement decision (1/CP.21) and the Annex to decision 4/CMA.1. While the Annex is only binding from the second NDC onwards, countries are "strongly encouraged" to apply it to updated NDCs, due in 2020.



NDC Transparency Check recommendations

For more visit www.climate-transparency.org/ndc-transparency-check

To ensure clarity, transparency and understanding, it is recommended that India provides additional detailed information in the upcoming NDC Update (compared to the existing NDC), including:

- Include information on the reference point year incl. time frame and period of implementation of the NDC targets.
- Specify sectors, gases, categories and pools covered by the nationally determined contribution, including, as applicable, consistent with Intergovernmental Panel on Climate Change (IPCC) guidelines.
- Provide information on domestic institutional arrangements, public participation and engagement with local communities and indigenous peoples, in a gender-responsive manner.
- Provide grounds on why the NDC represents the highest possible ambition.

AMBITION: LONG-TERM STRATEGIES

Status	In progress
2050 target	n/a
Interim steps	n/a
Sectoral targets	n/a
Net-zero target	n/a

The Paris Agreement invites countries to communicate mid-century, long-term, and low-GHG emissions development strategies by 2020. Long-term strategies are an essential component of the transition toward net-zero emissions and climate resilient economies.

3. FINANCE

MAKING FINANCE FLOWS CONSISTENT WITH CLIMATE GOALS



Make finance flows consistent with a pathway towards low-GHG emissions and climate-resilient development.



India spent USD 13.4bn on fossil fuel subsidies in 2019, almost completely on petroleum. India has **no explicit carbon price**, although it does have both taxes and subsidies in place for coal (the coal “cess”).



COMPATIBILITY

Investment in green energy and infrastructure needs to outweigh fossil fuels investments by 2025.

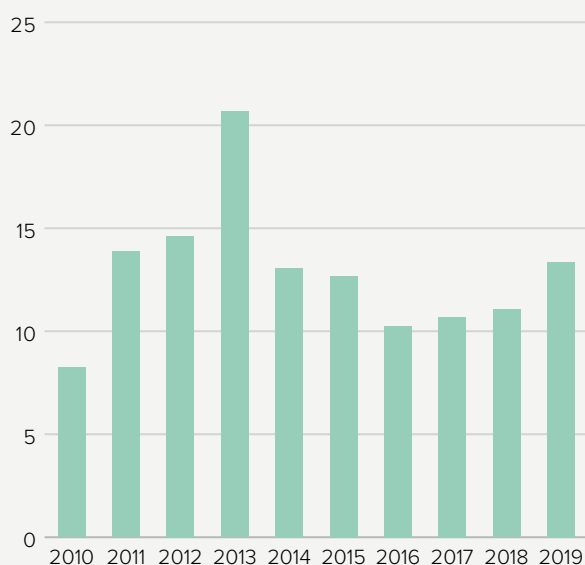
Source: Rogelj et al., 2018

FISCAL POLICY LEVERS

Fiscal policy levers **raise public revenues and direct public resources**. Critically, they can shift investment decisions and consumer behaviour towards low-carbon, climate-resilient activities by reflecting externalities in the price.

Fossil Fuel Subsidies

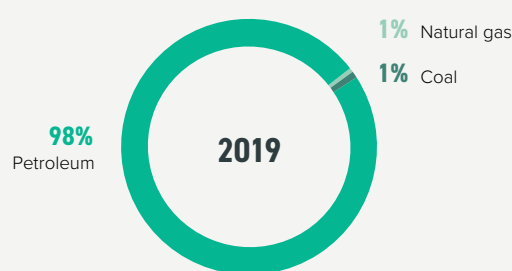
India Fossil fuel subsidies (USD billions)



Source: OECD-IEA Fossil Fuel Support database, 2020

Fossil Fuel Subsidies by fuel type

Subsidies by fuel type



Source: OECD-IEA Fossil Fuel Support database, 2020
Due to rounding, some graphs may sum to slightly above or below 100%.

In 2019, India's fossil fuel subsidies totalled USD 13.3bn (compared to USD 8.2bn in 2010 and the last decade's peak of USD 20.7bn in 2013). 99% of the subsidies quantified were for the consumption of fossil fuels, and only 1% for their production. Most of the subsidies were for petroleum use, at USD 13.1bn. The two measures which result in the highest amounts of subsidies are the direct benefit transfer scheme for LPG cylinders intended for household use (USD 7.3bn) and the customs duties reductions on fuels (USD 4bn).

Carbon Pricing and Revenue

No data available

India does not have a national carbon tax or emissions trading scheme, nor are any schemes planned. In 2017, India phased out the earmarking of revenues from the Clean Environment Cess (taxing coal) for environmental purposes, subsumed under the introduction of the centralised Goods and Services Tax.

CORONAVIRUS RECOVERY

The USD 266bn COVID-19 economic recovery plan is not focussed on climate change mitigation, but rather the buffering of job losses. Given that the agricultural sector is the greatest employment sector (42% of total employment), financial bailouts have been the government's focus. Spending has taken the form of direct employment guarantees in rural areas, in addition to a broader subsidy on food staples.

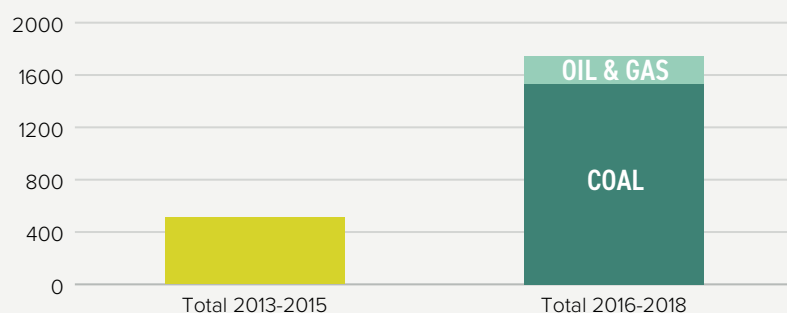
Source: Kugler and Sinha, 2020

PUBLIC FINANCE

Governments steer investments through their public finance institutions, including via development banks both at home and overseas, and green investment banks. Developed G20 countries also have an obligation to provide finance to developing countries, and public sources are a key aspect of these obligations under the UNFCCC.

Public finance for fossil fuels

Public finance provided to fossil fuels (in USD millions)



The database used to estimate public finance for fossil fuels is a bottom-up database, based on information that is accessible through various online sources and is, therefore, incomplete.

Source: Oil Change International, 2020

Between 2016 and 2018, India was the G20 third biggest public financier of coal, with an average support of USD 1.5bn per year. A comparatively smaller amount of public finance support (USD 213m on average per year) has been provided by the country to the oil and gas sector. All in all, the overall public finance support to fossil fuels has seen a substantial increase in the period 2016-2018 (USD 1.7bn on average per year) as compared to the previous period 2013-2015 (USD 511m on average per year). It is worth noting that, if India's majority government-owned banks had been included in this data, India's total fossil fuel finance between 2016 and 2018 would have shot from USD 1.7bn to USD 2.6bn a year, with more than two-thirds of that going to coal.

Provision of international public support

(annual average 2017 and 2018)

Climate finance contributions are sourced from Party reporting to the UNFCCC.

Bilateral, regional and other channels

No data available

Theme of support:

No data available

Multilateral climate finance contributions

No data available

Theme of support:

No data available

Core / General Contributions

No data available

India is not listed in Annex II of the UNFCCC and it is therefore **not formally obliged to provide climate finance**. Nonetheless, it continues to provide international public finance via the Global Environment Facility (GEF) Trust Fund. While India may channel international public finance towards climate change via multilateral and other development banks, it has not been included in this report.

FINANCIAL POLICY AND REGULATION

Financial policy and regulation

Through policy and regulation governments can **overcome challenges to mobilising green finance**, including: real and perceived risks, insufficient returns on investment, capacity and information gaps.

Category	Instruments	Objective	Under Discussion/ implementation		None identified	
Green Financial Principles	n/a	This indicates political will and awareness of climate change impacts, showing where there is a general discussion about the need for aligning prudential and climate change objectives in the national financial architecture.			●	
			Mandatory	Voluntary	Under Discussion/ implementation	None identified
Enhanced supervisory review, risk disclosure and market discipline	Climate risk disclosure requirements	Disclose the climate-related risks to which financial institutions are exposed		●		
	Climate-related risk assessment and climate stress-test	Evaluate the resilience of the financial sector to climate shocks				●
Enhanced capital and liquidity requirements	Liquidity instruments	Mitigate and prevent market illiquidity and maturity mismatch				●
	Lending limits	Limit the concentration of carbon-intensive exposures				●
		Incentivise low carbon-intensive exposures	●			
	Differentiated reserve requirements	Limit misaligned incentives and channel credit to green sectors				●

In 2015 the Reserve Bank of India (RBI) issued a circular titled “Guidelines on Lending to Priority Sectors”, which explicitly targeted renewable energy and agriculture, including providing additional funds and subsidies liquidity to banks for lending to environmentally-friendly projects, and imposing a minimum credit floor. The Securities and Exchange Board of India (SEBI) meanwhile requires detailed disclosure for the issuance and listing of Green Bonds, and has expanded its requirement for “responsibility reports” from the top 100 to top 500 businesses in the country. In 2019, RBI revised the 2015 Guidelines by including new priority sector lending sectors (i.e., renewable energy projects, grid-connected solar rooftop systems, agriculture, export credit, education, housing, social infrastructure, and micro, small and medium enterprises). In 2019, the RBI increased the target for priority sector lending by all scheduled commercial banks operating in India from 10-15% percent. **The target was then reverted to 10%, but an overall 40% of adjusted net bank credit is available for all priority sectors in total.** The Indian Banks Association is a member of the Sustainable Banking Network (SBN) since 2016.

Nationally Determined Contribution (NDC): Finance

Conditionality	Not applicable
Investment needs	Not specified
Actions	Not mentioned
International market mechanisms	No contribution from international credits for the achievement of the target

ENDNOTES

For more detail on the sources and methodologies behind the calculation of the indicators displayed, please download the Technical Note at: www.climate-transparency.org/g20-climate-performance/g20report2020





- 'Land use' emissions is used here to refer to land use, land use change and forestry (LULUCF). The Climate Action Tracker (CAT) derives historical LULUCF emissions from the UNFCCC Common Reporting Format (CRF) reporting tables data converted to the categories from the IPCC 1996 guidelines, in particular separating Agriculture from Land use, land use change and forestry (LULUCF), which under the new IPCC 2006 Guidelines is integrated into Agriculture, Forestry, and Other Land Use (AFOLU).
- The 1.5°C fair share ranges for 2030 and 2050 are drawn from the CAT, which compiles a wide range of perspectives on what is considered fair, including considerations such as responsibility,

capability, and equality. Countries with 1.5°C fair-share ranges reaching below zero, particularly between 2030 and 2050, are expected to achieve such strong reductions by domestic emissions reductions, supplemented by contributions to global emissions reduction efforts via, for example, international finance. On a global scale, negative emissions technologies are expected to play a role from the 2030s onwards, compensating for remaining positive emissions. The CAT's evaluation of NDCs shows the resulting temperature outcomes if all other governments were to put forward emissions reduction commitments with the same relative ambition level.

- In order to maintain comparability across all countries, this report utilises the PRIMAP year of 2017. However, note that Common Reporting Format (CRF) data is available for countries which have recently updated GHG inventories.
- The Decarbonisation Ratings assess the current

year and average of the most recent five years (where available) to take account of the different starting points of different G20 countries.

- The selection of policies rated and the assessment of 1.5°C compatibility are informed by the Paris Agreement, the IPCC's 2018 SR15 and the Climate Action Tracker (2016). The table below displays the criteria used to assess a country's policy performance.
- This indicator adds up emissions from domestic aviation and international aviation bunkers in the respective country. In this Country Profile, however, only a radiative forcing factor of 1 is assumed.
- This indicator includes only direct energy-related emissions and process emissions (Scope 1) but not indirect emissions from electricity.
- This indicator includes emissions from electricity (Scope 2) as well as direct energy-related emissions and process emissions (Scope 1).

On endnote 5.	 Low	 Medium	 High	 Frontrunner
Renewable energy in power sector	No policy to increase the share of renewables	Some policies	Policies and longer-term strategy/target to significantly increase the share of renewables	Short-term policies + long-term strategy for 100% renewables in the power sector by 2050 in place
Coal phase-out in power sector	No target or policy in place for reducing coal	Some policies	Policies + coal phase-out decided	Policies + coal phase-out date before 2030 (OECD and EU28) or 2040 (rest of the world)
Phase out fossil fuel cars	No policy for reducing emissions from light-duty vehicles	Some policies (e.g. energy/emissions performance standards or bonus/malus support)	Policies + national target to phase out fossil fuel light-duty vehicles	Policies + ban on new fossil-based light-duty vehicles by 2035 worldwide
Phase out fossil fuel heavy-duty vehicles	No policy	Some policies (e.g. energy/emissions performance standards or support)	Policies + strategy to reduce absolute emissions from freight transport	Policies + innovation strategy to phase out emissions from freight transport by 2050
Modal shift in (ground) transport	No policies	Some policies (e.g. support programmes to shift to rail or non-motorised transport)	Policies + longer-term strategy	Policies + longer-term strategy consistent with 1.5°C pathway
Near zero energy new buildings	No policies	Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options)	Policies + national strategy for near zero energy new buildings	Policies + national strategy for all new buildings to be near zero energy by 2020 (OECD countries) or 2025 (non-OECD countries)
Energy efficiency in Industry	0-49% average score on the policy-related metrics in the ACEEE's International Energy Efficiency Scorecard	50-79% average score on the policy-related metrics in the ACEEE's International Energy Efficiency Scorecard	80-89% average score on the policy-related metrics in the ACEEE's International Energy Efficiency Scorecard	Over 90% average score on the policy-related metrics in the ACEEE's International Energy Efficiency Scorecard
Retrofitting existing buildings	No policies	Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options)	Policies + retrofitting strategy	Policies + strategy to achieve deep renovation rates of 5% annually (OECD) or 3% (non-OECD) by 2020
Net-zero deforestation	No policy or incentive to reduce deforestation in place	Some policies (e.g. incentives to reduce deforestation or support schemes for afforestation / reforestation in place)	Policies + national target for reaching net-zero deforestation	Policies + national target for reaching zero deforestation by 2020s or for increasing forest coverage

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